

Name: _____

at1121exam_practice: Radicals and Squares (v17)

Question 1

Simplify the radical expressions.

$$\sqrt{18}$$

$$\sqrt{98}$$

$$\sqrt{63}$$

$$\frac{\sqrt{3 \cdot 3 \cdot 2}}{3\sqrt{2}}$$

$$\frac{\sqrt{7 \cdot 7 \cdot 2}}{7\sqrt{2}}$$

$$\frac{\sqrt{3 \cdot 3 \cdot 7}}{3\sqrt{7}}$$

Question 2

Find all solutions to the equation below:

$$\frac{(x+7)^2 + 6}{2} = 53$$

First, multiply both sides by 2.

$$(x+7)^2 + 6 = 106$$

Then, subtract 6 from both sides.

$$(x+7)^2 = 100$$

Undo the squaring. Remember the plus-minus symbol.

$$x+7 = \pm 10$$

Subtract 7 from both sides.

$$x = -7 \pm 10$$

So the two solutions are $x = 3$ and $x = -17$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 12x = 85$$

$$x^2 + 12x + 36 = 85 + 36$$

$$x^2 + 12x + 36 = 121$$

$$(x + 6)^2 = 121$$

$$x + 6 = \pm 11$$

$$x = -6 \pm 11$$

$$x = 5 \quad \text{or} \quad x = -17$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 + 30x + 81$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 + 10x) + 81$$

We want a perfect square. Halve 10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 + 10x + 25 - 25) + 81$$

Factor the perfect-square trinomial.

$$y = 3((x + 5)^2 - 25) + 81$$

Distribute the 3.

$$y = 3(x + 5)^2 - 75 + 81$$

Combine the constants to get **vertex form**:

$$y = 3(x + 5)^2 + 6$$

The vertex is at point $(-5, 6)$.